

§ 27.687

(9) Turnbuckles attached to parts having angular motion must be installed to prevent binding throughout the range of travel.

(10) There must be means for visual inspection at each fairlead, pulley, terminal, and turnbuckle.

(e) Control system joints subject to angular motion must incorporate the following special factors with respect to the ultimate bearing strength of the softest material used as a bearing:

(1) 3.33 for push-pull systems other than ball and roller bearing systems.

(2) 2.0 for cable systems.

(f) For control system joints, the manufacturer's static, non-Brinell rating of ball and roller bearings must not be exceeded.

[Doc. No. 5074, 29 FR 15695, Nov. 24, 1964, as amended by Amdt. 27-11, 41 FR 55469, Dec. 20, 1976; Amdt. 27-26, 55 FR 8001, Mar. 6, 1990; 69 FR 18803, Apr. 9, 2004]

§ 27.687 Spring devices.

(a) Each control system spring device whose failure could cause flutter or other unsafe characteristics must be reliable.

(b) Compliance with paragraph (a) of this section must be shown by tests simulating service conditions.

§ 27.691 Autorotation control mechanism.

Each main rotor blade pitch control mechanism must allow rapid entry into autorotation after power failure.

§ 27.695 Power boost and power-operated control system.

(a) If a power boost or power-operated control system is used, an alternate system must be immediately available that allows continued safe flight and landing in the event of—

(1) Any single failure in the power portion of the system; or

(2) The failure of all engines.

(b) Each alternate system may be a duplicate power portion or a manually operated mechanical system. The power portion includes the power source (such as hydraulic pumps), and such items as valves, lines, and actuators.

(c) The failure of mechanical parts (such as piston rods and links), and the jamming of power cylinders, must be

14 CFR Ch. I (1-1-06 Edition)

considered unless they are extremely improbable.

LANDING GEAR

§ 27.723 Shock absorption tests.

The landing inertia load factor and the reserve energy absorption capacity of the landing gear must be substantiated by the tests prescribed in §§ 27.725 and 27.727, respectively. These tests must be conducted on the complete rotorcraft or on units consisting of wheel, tire, and shock absorber in their proper relation.

§ 27.725 Limit drop test.

The limit drop test must be conducted as follows:

(a) The drop height must be—

(1) 13 inches from the lowest point of the landing gear to the ground; or

(2) Any lesser height, not less than eight inches, resulting in a drop contact velocity equal to the greatest probable sinking speed likely to occur at ground contact in normal power-off landings.

(b) If considered, the rotor lift specified in § 27.473(a) must be introduced into the drop test by appropriate energy absorbing devices or by the use of an effective mass.

(c) Each landing gear unit must be tested in the attitude simulating the landing condition that is most critical from the standpoint of the energy to be absorbed by it.

(d) When an effective mass is used in showing compliance with paragraph (b) of this section, the following formula may be used instead of more rational computations:

$$W_e = W \times \frac{h + (1-L)d}{h + d}; \text{ and}$$

$$n = n_j \frac{W_e}{W} + L$$

where:

W_e =the effective weight to be used in the drop test (lbs.);

$W=W_M$ for main gear units (lbs.), equal to the static reaction on the particular unit with the rotorcraft in the most critical attitude. A rational method may be used in computing a main gear static reaction, taking into consideration the moment arm